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TITLE: DEVELOPMENT OF THE OMPAT NEUROPSYCHOLOGICAL/PSYCHOMOTOR PERFORMANCE EVALUATION AND OMPAT DATA AND TIMING SUPPORT PROGRAMS

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Kirk P. White 10/15/92
Principal Investigator's Signature Date



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1. INTRODUCTION

This annual report provides a summary of work completed for the development of the Neuropsychological/Psychomotor Performance Evaluation and timing support programs during the fiscal year 1992. This effort took place at the Navy Computer and Telecommunications Station, Pensacola, FL.

The objective of this project is to computerize and document a select group of psychomotor and neuropsychological tests into an adaptable battery which provides a standardized, clinically relevant and rapid method for assessment of nervous system integrity. This battery or group of test batteries should be dynamic in nature, appealing to a broad spectrum of human performance researchers as well as the clinician.

Previously developed computerized software provided relevant data and information for human performance researchers but often was "hard coded" for a specific type of research or equipment and was unusable for similar human performance testing due to time, space or economic constraints, etc.

Computerized software developed to date, requires no additional equipment other than a standard IBM AT compatible personal computer. The test may be run independently or as a battery composed by the researcher.



2. METHODS

The Level I TAG has specified the Neuropsychological Performance Evaluation to meet the requirements below. Software developed includes timing modules to provide millisecond accuracy for subject/patient response times. All program modules developed are compatible in data format, instruction formats and tests structure to existing OMPAT batteries (e.g., UTC-PAB/AGARD STRES/ANAM Battery.) This standard for testing software all provide for ease of use for all researchers and versatility of software usage. Design characteristics incorporated into the test software are as follows:

- 1) Local area networking (LAN) capability allowing for simultaneous subject testing in a controlled laboratory or field site. A level of security for test software is provided, as the individual subjects data and test setups may be stored at a location other than where the test software resides (a fileserver or alternate disk drive). There is no test program requirement for writing information in the area where the testing software exists so software may be protected from the subject.
- 2) The ability to test a large domain of neuropsychological functions including sensory, perceptual and cognitive abilities.
- 3) Sensitivity to detect the interactive and independent effects of chemical agents and other stressors, i.e., heat, cold and fatigue on neuropsychological functions.
- 4) Compatibility with existing normative databases for comparison of test results with standardization samples such as age, education and occupational norms.
- 5) Multiple options for ordering subtests, storage and presentation of test data.
- 6) Operator control of stimulus presentation order, length of interstimulus intervals, duration of test, results feedback, composition of test instructions, response key definitions, size of stimulus display.

3. RESULTS

Neuropsychological performance evaluation software has been developed specifically designed to screen for deficits in the following domains: attention, memory, verbal skills, spatial skills and motor performance. The Level I Automated Neuropsychological Assessment Metrics(ANAM) is a collection of individual tests that can be run independently or run with the ANAM menu system as a test battery. It is extremely versatile at the single test level and may be used for human performance measures by the clinician or researcher.

Initial reports from researchers and clinicians resulted in minor modifications to beta software to further address the issues of neurodiagnostic evaluation and performance testing. Preliminary feedback from clinicians and researchers are encouraging. Additional human performance tests have been created to provide depth to the existing software measures. Tools to aid in data analysis were also added. This effort has created the concept of the "Testers Workbench". An unlimited number of test batteries may now be created. The generic menu system along with performance software that may be manipulated by the tester allow for the building of performance batteries that meet the needs of each testers individual situation.



4. CONCLUSIONS

The demand for neuropsychological human performance evaluation software has increased. Software that is independent of embedded program constraints and not performance battery specific is meeting the needs of both clinicians and researchers. Although the area of human performance addressed is extremely diverse, evaluation of head injury patients to pilot performance, flexible dynamic performance tests can be used for a variety of situations.



APPENDIX

TECHNOLOGY TRANSFER

Transferred upgraded ANAM/UTC-PAB/STRES software to USAFSAM Brooks AFB, San Antonio for use in performance testing for the IML-2 space shuttle launch of January 1994.

Transferred human performance neuropsychological testing software to the National Institute of Health for use in clinical evaluations. Provided onsite training.

Transferred human performance neuropsychological testing software to the National Naval Medical Center, Bethesda, MD for use in clinical evaluations. Provided onsite training.

Transferred human performance neuropsychological testing software to the Walter Reed Army Hospital, Washington, DC for use in clinical evaluations. Provided onsite training.

Transferred human performance neuropsychological testing software to Krug International Life Sciences (Behavior and Performance Laboratory at Johnson Space Center, Houston) for use in NASA's underwater habitation research program which took place at the Jules' Undersea Lodge in Key Largo, FL, May 1992. Performance software was used to measure stress effects of confinement on aquanauts.

Transferred human performance neuropsychological testing software to Edward Philpot, MD, Vacaville, CA.

Transferred human performance neuropsychological testing software to Group Health Inc., Mental Health Center, Minneapolis, MN for use in clinical evaluations.

Transfers made during FY91, software updates are still being requested by the following:

Transferred human performance neuropsychological testing software to NAMI, Pensacola NAS for evaluation.
Provided onsite installation and training.

Transferred human performance neuropsychological testing software to NBDL, New Orleans NAS for use in ship motion research.
A setup, installation procedure and software demonstration was provided at Pensacola NAS.



Transferred human performance neuropsychological testing software to USAARL, Ft Rucker for human performance research. A demonstration of software and installation procedures was provided at Pensacola NAS.

Transferred upgraded STRES software to NAMRL, Pensacola NAS for use in sustained operations performance testing.

Transferred upgraded STRES software to USAFSAM Brooks AFB, San Antonio for use in performance testing.

Transferred human performance neuropsychological testing software to National Rehabilitation Hospital, Washington, DC for evaluation of brain injury patients. A setup, installation and demonstration of software was provided at NRH.

Transferred human performance neuropsychological testing software to Krug International Life Sciences to support ongoing NASA research at the Johnson Space Center, Houston, TX.

Transferred human performance neuropsychological testing software to the University of Massachusetts Medical Center to support ongoing research in neuropsychological assessment. A setup, installation and demonstration of software was provided.

Transferred human performance neuropsychological testing software to Georgetown University Medical Center, Department of Neurology, Washington, DC to support neurodiagnostic procedures. A setup, installation and demonstration of software was provided at GU.

Presentation and Publications

Reeves, D., Schlegel, R., Guilland, K. and Crabtree, M.. UTC-PAB and the NATO/AGARD STRES Battery: Results from standardization studies. Proceedings of the 1991 Medical Defense Bioscience Review. Aberdeen Proving Grounds, MD, 1991.

Winter, K. and Reeves, D. Update and Software Demonstration of UTC-PAB, ANAM and AAMS. Presented at the OMPAT Technical Advisory Group Meeting, 06 AUG 1991.

Hegge, F., Elsmore, T., Reeves, D. Office of Military Performance and Assessment Technology (OMPAT): Demonstration of OMPAT Software Products. Presented at the 1991 Army Research Psychologist (68T) Meeting, Silver Spring, MD 16-19 SEP 1991.

